MEMORANDUM

To: Diane Salkie and Michael Sivak, USEPA

From: Cooperating Parties Group

Date: May 10, 2018

Subject: Upper 9-Mile Interim Action – NJDEP Questions & CSTAG Recommendations

The Lower Passaic River Cooperating Parties Group (CPG) understands that the New Jersey Department of Environmental Protection (hereafter Department) has raised concerns regarding the proposed Upper 9-Mile Interim Action (IA). These include:

- Lack of risk-based language in the IA Remedial Action Objectives (RAOs)
- Lack of risk-based remediation goals in a future Upper 9-Mile IA Record of Decision (ROD)
- Post IA performance monitoring
- Identification of final remedial goals for the upper 9 miles.

In its April 25, 2018 memorandum, EPA's Contaminated Sediment Technical Advisory Group (CSTAG) expressed support for the Upper 9-Mile IA proposal and offered 10 recommendations for EPA Region 2's consideration. Several of the CSTAG recommendations address subjects that are relevant to the Department's concerns.

The CPG offers the following general responses in light of the Department's concerns as well as our view as to how Region 2 plans to respond to CSTAG's April 25 recommendations.

Introduction

The CPG understands that EPA supports moving forward with an IA for the upper 9-mile reach of the LPR. CSTAG's April 26 recommendations, consistent with EPA OLEM's 2017 recommendation to "*consider early actions during the remedial investigation/feasibility study (RI/FS) in site areas presenting high risks to help reduce risks quickly*", recognized clear and substantial benefits to implementing the IA[1]. Sources will be controlled, exposure of people and ecosystems to contamination will be substantially reduced, and the interim action in the upper 9 miles will be better aligned with the Lower 8-Mile RA, reducing the impacts to the communities along the river and allowing cleanup in the upper 9 miles to proceed years earlier.

Region 2 is likely to structure the Interim Action with two major elements:

- Active Remediation Element – an interim remedial action to achieve source control and a large decrease in surficial sediment exposure concentrations.

[1] See CSTAG Recommendations 1, 2, and 10

  - RAOs will pertain to the Active Remediation Element and ensure at the end of implementation specific, quantifiable reductions in exposure have been attained.[2]

- Adaptive Management Element – post-construction adaptive management including a performance monitoring program to track the risk reduction achieved and progress toward meeting risk-based remediation goals. The CPG supports this approach and believes it is consistent with the CSTAG recommendations.

  - The Adaptive Management Element will include monitoring requirements, metrics for remedy performance, triggers for further action, and steps to be taken to ensure adequate progress toward final risk-based remedial goals.

  - A robust post-IA performance monitoring program will be a central element of the Adaptive Management Element. A preliminary framework for the post-IA monitoring program has been developed and provided to EPA, and additional detail will be developed in the FS. The detailed post-IA performance monitoring plan will be developed and finalized during the remedial design (RD).

Following the IA and as part of the Adaptive Management Element, at least one subsequent ROD will be required to define any additional actions needed to achieve final risk-based remediation goals, as well as long-term monitoring and maintenance requirements for the upper 9-mile reach. The Department, as one of the Partner Agencies, will have opportunity for input into the subsequent ROD.

The Upper 9-Mile Interim Action Will Lead to a Protective Final Cleanup

The Department's concerns regarding the IA objectives and attainment of risk-based goals are reasonable but are largely applicable to the post-implementation Adaptive Management Element, not the Active Remediation Element.

As presented at the March 1, 2018 CSTAG stakeholder meeting:

- The Active Remediation Element of the IA will be designed to substantially reduce exposure concentrations of 2,3,7,8-TCDD and Total PCBs, expressed as surface-area weighted average concentration (SWAC), and will address the sediment in the upper 9 miles that is not recovering and therefore inhibiting recovery of the river.

- Sediment remedial action levels (RALs) that will achieve the SWAC reduction and source control goals for 2,3,7,8-TCDD and Total PCBs will be developed in the

[2] CSTAG supports the use of reduction in surface-area weighted average concentration (SWAC) as an appropriate metric for exposure reduction achieved by the IA (CSTAG April 26 Recommendation 2.a).

feasibility study and refined during the RD, based on results of detailed pre-design investigation (PDI) sampling.

- Available information, including preliminary modeling by the EPA, suggests a reasonable likelihood that, following implementation of the Active Remediation Element and a period of recovery, risk-based remedial goals may be met without additional active remediation. This will be re-evaluated based on new data and analyses generated during the RD.
- Under the Adaptive Management Element, the EPA, with input from the Department and the other Partner Agencies, will evaluate the post-IA performance monitoring results to determine whether additional remedial action is needed to achieve a protective final remedy.

CSTAG's recommendations also emphasized that the NCP requires that interim actions *"should not be inconsistent with nor preclude implementation of the expected final remedy."* The Upper 9-Mile IA will be designed consistent with this requirement.

The Proposed Remedial Action Objectives for the Upper 9-Mile IR Will Be Adaptive

The CPG understands that EPA Region 2 is evaluating changes to the IA RAOs to fully align them with the CSTAG recommendations. The CPG supports this review and the participation of the Department in this process. Specifically, the CPG anticipates that Region 2's revised RAOs will:

- Directly address sediment source materials in the upper 9 miles that are impeding recovery;
- Specify a required minimum reduction in the SWAC of 2,3,7,8-TCDD and Total PCBs; and
- Call for the removal of subsurface sediment that has the potential to erode and contribute to risk and impede recovery.

Achieving RAOs directed to the Active Remediation Element will significantly reduce human health and ecological risks, accelerate continued recovery of the river, and establish through adaptive management a path forward for a final remedy for the upper 9 miles.

The CPG expects the revised RAOs will themselves be adaptive in nature. The final footprint of the Active Remediation Element will need to be re-evaluated and established during the RD to assure that the SWAC reduction target will be met. The proposed RALs will be modified, if necessary, to meet the SWAC reduction targets for 2,3,7,8-TCDD and Total PCBs. Following implementation of Active Remediation, there will be performance monitoring under the Adaptive Management Element to evaluate

remedial performance, establish recovery trajectories, and identify the need for any additional active remediation.

The Upper 9-Mile IA Is Likely To Provide Significant Risk Reduction Immediately Following Completion

Although the Active Remediation Element will not establish risk-based final remediation goals for the IA, the IA will result in significant human health and ecological risk reductions. The March 1 CSTAG stakeholder presentation estimated initial (post-construction) risk reductions for both human health (cancer and non-cancer) and ecological risk at the end of the IA. These estimates do not include further reductions as the result of post-IA recovery.

Assuming a 90% SWAC reduction the projected risk reductions following completion of the IA are:

- The immediate post-IA fish consumption (RME mixed fish diet including carp adult/child anglers) cancer and non-cancer risks (child angler) will be reduced by ~96% for 2,3,7,8-TCDD and ~85% for Total PCBs[3] (Figures 1 and 2).
- Ecological reductions for three representative ecological receptors (white perch, carp and sandpiper) are estimated to be 96% for 2,3,7,8-TCDD and 84 to 88% for Total PCBs (Table 1).
- Moreover, depending whether the FFS or CPG toxicity reference values (TRVs)[4] on the TRV used for both 2,3,7,8-TCDD and Total PCBs, estimated HQs are below an HQ of 1 for the receptors (with the exception of carp using the FFS TRVs which are 15 and 1.6, respectively, and for white perch the 2.3.7.8-TCDD HQ is 4) immediately following the Upper 9-Mile IA (Figures 3 and 4).

The IA is likely to result in large reductions in human health and ecological risk immediately following completion.

Upper 9-Mile IA PDI and RD Will Establish the Final Remedial Footprint

As stated previously, the final remedial footprint necessary to achieve the RAOs will be established in the IA RD following the PDI.

- The final IA footprint will be defined through a high-density sediment sampling program (e.g., 80 feet on center triangular grid) in the PDI. These data will be used to calculate pre- and post-remediation SWACs for 2,3,7,8 TCDD and Total PCBs and establish the final RALs.

[3] These risk estimates assume that the Lower 8-Mile Remedial Action and Upper 9-Mile IR are completed in the same time period (i.e., mid to late 2020s).
[4] EPA has acknowledged that the processes for risk assessment TRV selection all contain some degree of uncertainty due to a variety of factors. TRVs derived for the FFS and by CPG for the BERA were used in the 2017 revised 17-mile BERA and in the post IR risk calculations. It is likely that the calculated HQs from FFS and CPG TRVs provide an upper and lower range of both the baseline and Post IR risk to these receptors.

- Consistent with CSTAG Recommendation 9, Areas that have a reasonable likelihood of impacting recovery via erosion but are not targeted through the surface sediment SWAC reduction will be added to the removal footprint. These areas have a likelihood that erosion would expose sediment below the sediment surface, with subsurface 2,3,7,8-TCDD and/or Total PCB concentrations in excess of the respective RALs. To address this RAO, the PDI sampling will include subsurface sediment sampling to the depth of potential erosion and/or depth of removal.

  Erosion potential will be assessed based on observed bathymetric changes, in the manner presented in the draft Remedial Investigation Report, and through high resolution hydrodynamic modeling of high flow event shear stresses conducted during the RD coupled with erosion parameters established for the LPRSA sediment transport modeling.

CSTAG Recommendation 9b included a request for the CPG to conduct an updated bathymetry survey during the preparation of the FS; EPA requested in a May 4 that the CPG undertake this survey and the CPG is currently updating the existing QAPP.

CSTAG Recommendation 10 proposed collection of pre-design data in advance of the IA remedial design; the CPG will work with EPA and the Department to identify an appropriate pre-design data needs that will support the development of the Active Remediation Element and Adaptive Management Element during the PDI and RD.

Adaptive Management Element Will Ensure the Final Remedy Will Meet Risk-Based Cleanup Goals

Consistent CSTAG Recommendation 6, the Adaptive Management Element will include a robust performance monitoring program to evaluate the effectiveness of the active remediation and the need for any further action (to be established in one or more subsequent RODs). The CPG has outlined a framework for performance monitoring program in its February 9, 2018 Upper 9-Mile IA proposal, and this framework will be further defined in the FS. A detailed plan with criteria, trigger and response actions will be drafted as part of the IA RD.

The chemical fate and transport (CFT) and the bioaccumulation models will be refined with data obtained during the PDI. During the RD, the models will be used to develop recovery curves that can provide an estimate of the likely rate of risk reduction. This information will guide post-IA performance monitoring for the primary COCs driving risk. If the data indicate inhibited recovery, then a diagnostic assessment will be performed, and additional response actions will be developed for inclusion in a subsequent ROD.

Summary

The CPG anticipates that the final ROD for the upper 9 miles will specify final remediation goals that are risk-based to ensure protection of human health and the environment. The

Department, along with all other Partner Agencies, will have substantial opportunity for input to the final remediation goals established for the upper 9 miles.

The RAOs under consideration for the IA are inherently adaptive and the PDI data will determine the need to adjust the remedial footprint and the proposed RALs to address the surface and erodible subsurface sediment in order to meet the RAO performance metrics. Performance monitoring under the Adaptive Management Element will determine whether the IA is sufficiently protective of human and ecological receptors or if further actions are required under a subsequent ROD(s).

The Upper 9-Mile IA is consistent with EPA guidance and supported by CSTAG's recommendations, will rapidly address sediment in the upper 9 miles that are known to represent risks to human health and the environment, and allow for greater coordination with the Lower 8-Mile Remedial Action. The IA has been developed to be adaptive and responsive to the collection of new data and information throughout the entire process from the PDI/RD to the Adaptive Management Element. Based on these results, EPA, with input from all stakeholders, will develop the subsequent ROD(s) that will determine (1) the final risked-based remediation goals and (2) if further action is required to meet those remediation goals.

In summary:

- Achieving the Active Remediation Element RAOs will result in substantial reductions in human health and ecological risk.
- The Adaptive Management Element with a robust post-construction performance monitoring program is an integral element of the IA. An initial framework for the post-IA performance monitoring program has been developed and provided to EPA[5], and additional detail will be provided in the FS. The RD deliverables will include the detailed Adaptive Management Element plan.
- At least one subsequent ROD beyond the IA ROD will be required to define any additional actions needed to achieve risk-based remediation goals. The final ROD will specify final risk-based remediation goals, and the Department, as one of the Partner Agencies, will have opportunity to provide input on the subsequent ROD(s).

The Department's stated concerns are reasonable, but as detailed in this response, all of the concerns can and will be addressed as part of the IA ROD and the subsequent ROD(s). The CPG looks forward to reaching agreement with the EPA and the Department on revised RAOs for the upper 9 miles, completing the FS and selecting an effective Upper 9-Mile IA's Active Remediation Element and developing the Adaptive Management Element.

[5] CPG's February 9, 2018 CSTAG deliverables

Figure 1.

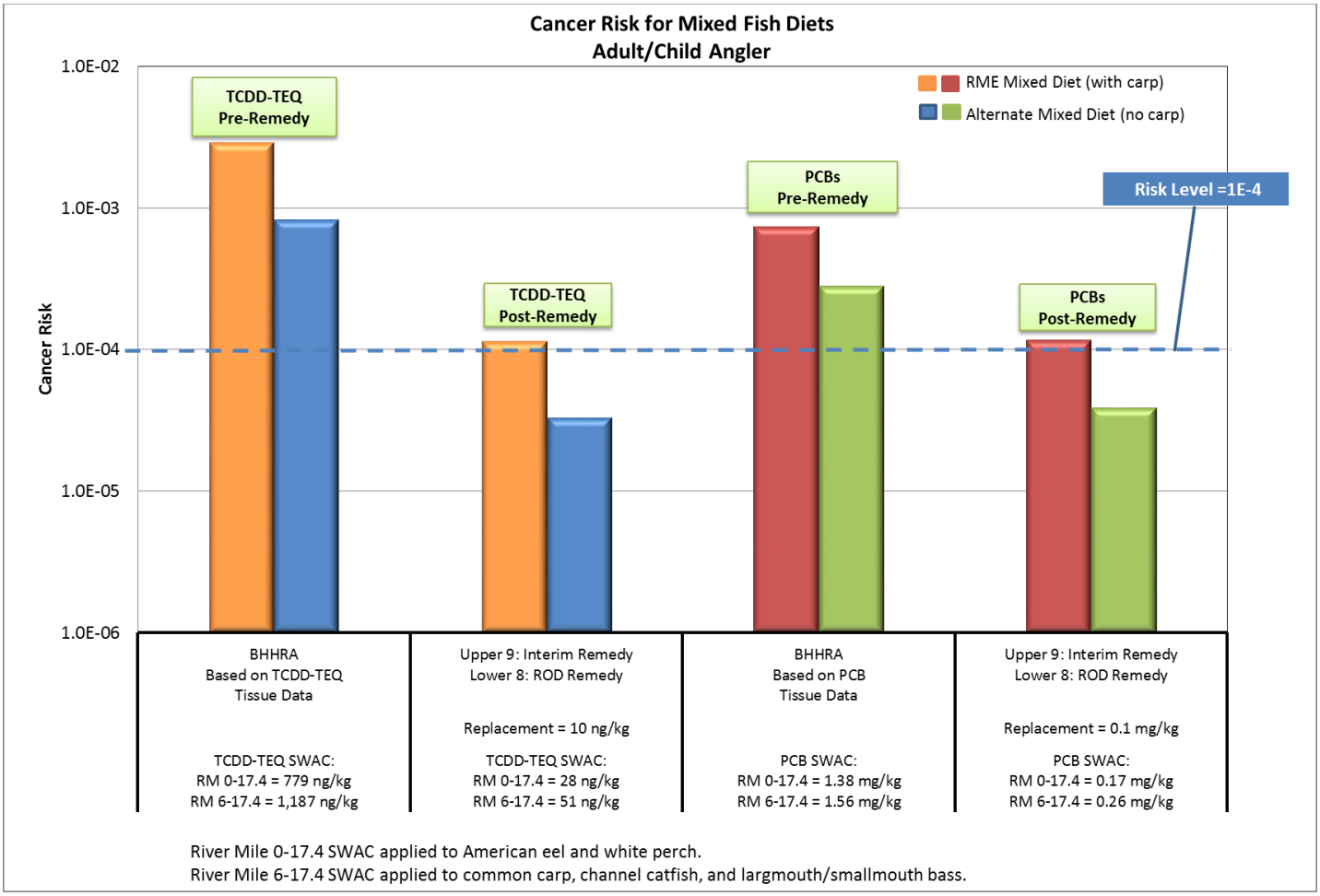
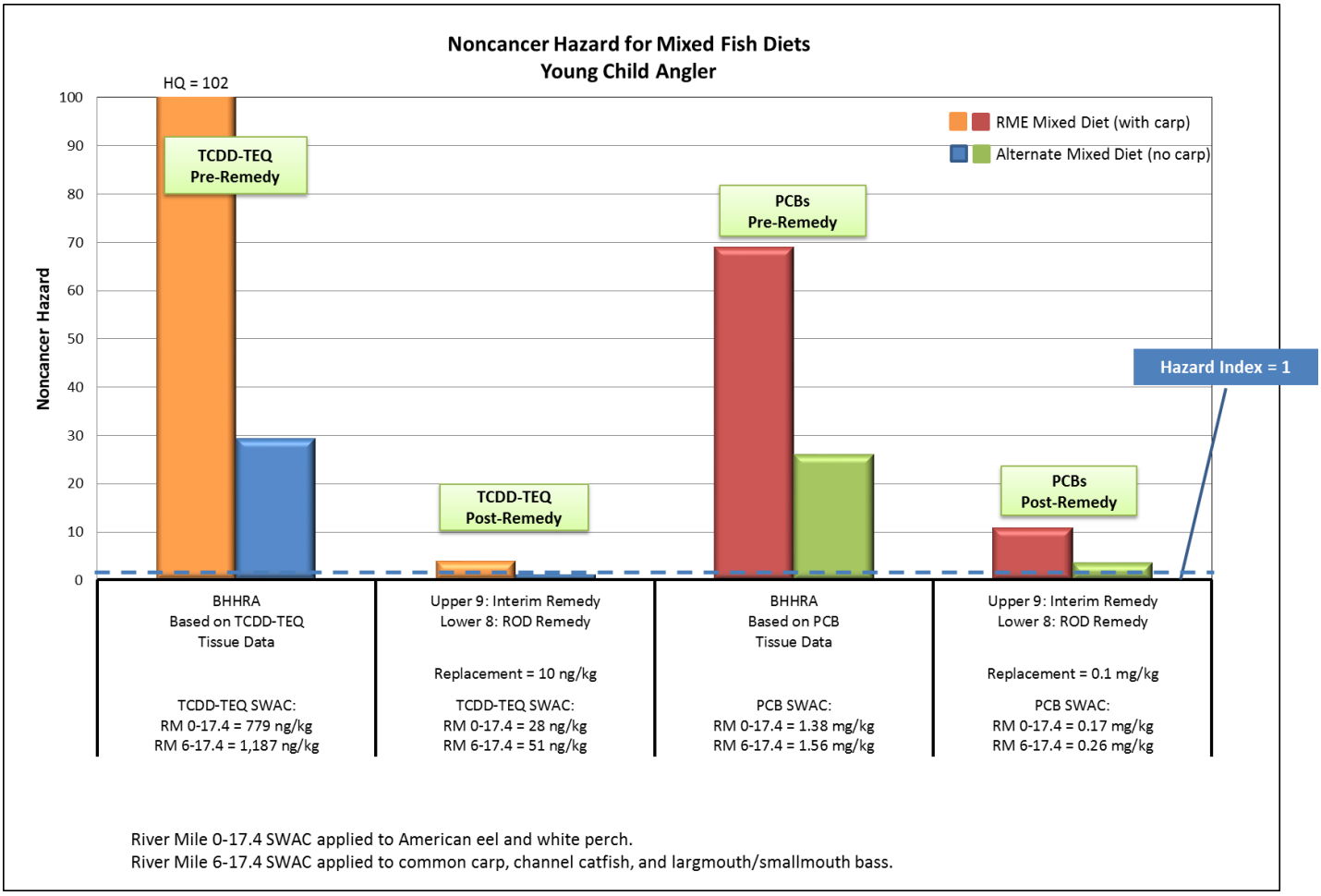

Cancer Risk for Mixed Fish Diets
Adult/Child Angler
RME Mixed Diet (with carp)
Alternate Mixed Diet (no carp)
Cancer Risk
1.0E-02
1.0E-03
1.0E-04
1.0E-05
1.0E-06
TCDD-TEQ Pre-Remedy
TCDD-TEQ Post-Remedy
PCBs Pre-Remedy
PCBs Post-Remedy
Risk Level =1E-4
BHHRA Based on TCDD-TEQ Tissue Data
TCDD-TEQ SWAC:
RM 0-17.4 = 779 ng/kg
RM 6-17.4 = 1,187 ng/kg
Upper 9: Interim Remedy
Lower 8: ROD Remedy
Replacement = 10 ng/kg
TCDD-TEQ SWAC:
RM 0-17.4 = 28 ng/kg
RM 6-17.4 = 51 ng/kg
BHHRA Based on PCB Tissue Data
PCB SWAC:
RM 0-17.4 = 1.38 mg/kg
RM 6-17.4 = 1.56 mg/kg
Upper 9: Interim Remedy
Lower 8: ROD Remedy
Replacement = 0.1 mg/kg
PCB SWAC:
RM 0-17.4 = 0.17 mg/kg
RM 6-17.4 = 0.26 mg/kg
River Mile 0-17.4 SWAC applied to American eel and white perch.
River Mile 6-17.4 SWAC applied to common carp, channel catfish, and largmouth/smallmouth bass.

Figure 2.


Noncancer Hazard for Mixed Fish Diets
Young Child Angler
HQ = 102
RME Mixed Diet (with carp)
Alternate Mixed Diet (no carp)
Noncancer Hazard
100
90
80
70
60
50
40
30
20
10
0
TCDD-TEQ Pre-Remedy
TCDD-TEQ Post-Remedy
PCBs Pre-Remedy
PCBs Post-Remedy
Hazard Index = 1
BHHRA Based on TCDD-TEQ Tissue Data
TCDD-TEQ SWAC:
RM 0-17.4 = 779 ng/kg
RM 6-17.4 = 1,187 ng/kg
Upper 9: Interim Remedy Lower 8: ROD Remedy
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River Mile 6-17.4 SWAC applied to common carp, channel catfish, and largmouth/smallmouth bass.

Figure 3.

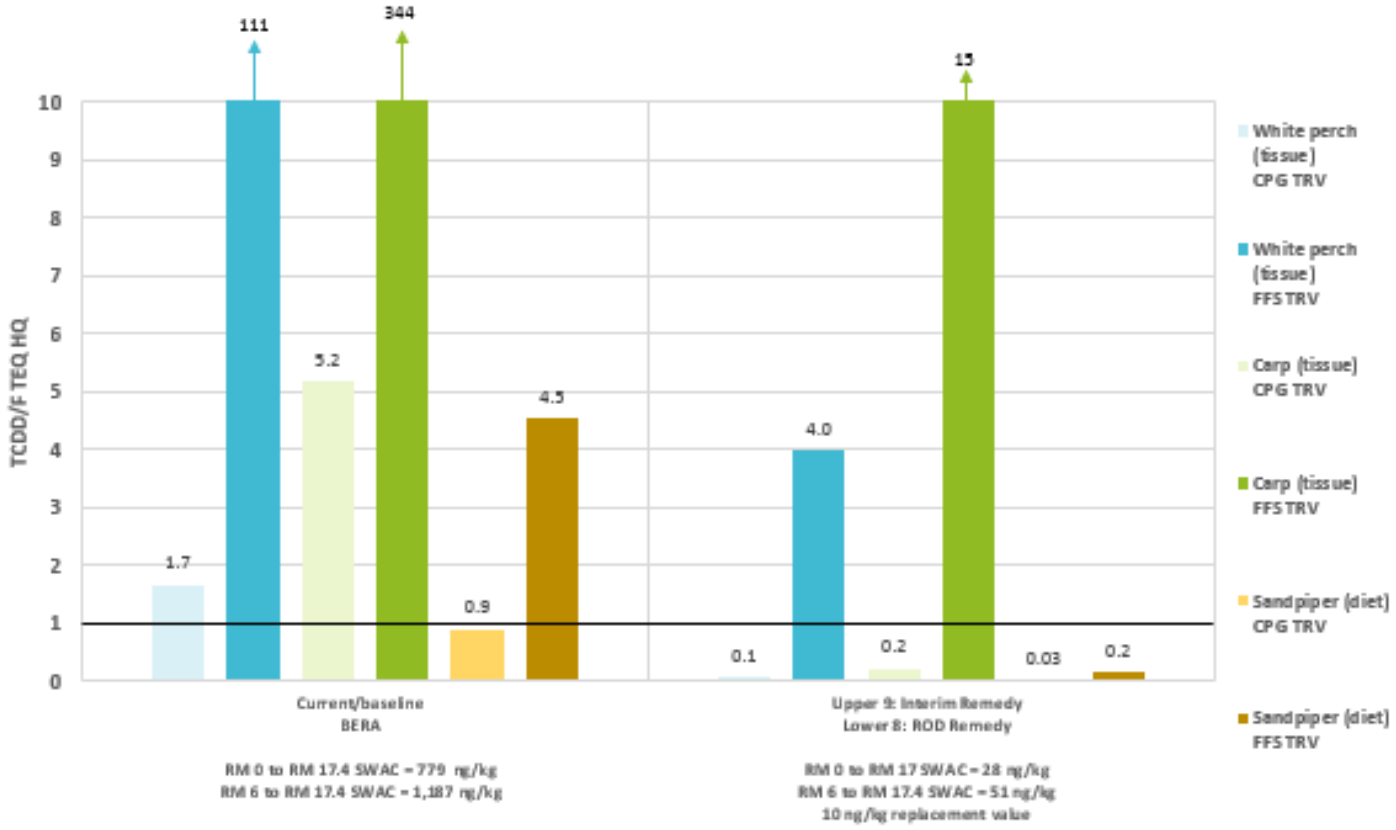
TCDD/F TEQ HQ
0
1
2
3
4
5
6
7
8
9
10
1.7
111
5.2
344
0.9
4.5
0.1
4.0
0.2
15
0.03
0.2
Current/baseline
BERA
RM 0 to RM 17.4 SWAC = 779 ng/kg
RM 6 to RM 17.4 SWAC = 1,187 ng/kg
Upper 9: Interim Remedy
Lower 8: ROD Remedy
RM 0 to RM 17 SWAC = 28 ng/kg
RM 6 to RM 17.4 SWAC = 51 ng/kg
10 ng/kg replacement value
White perch (tissue) CPG TRV
White perch (tissue) FFS TRV
Carp (tissue) CPG TRV
Carp (tissue) FFS TRV
Sandpiper (diet) CPG TRV
Sandpiper (diet) FFS TRV

Figure 4.

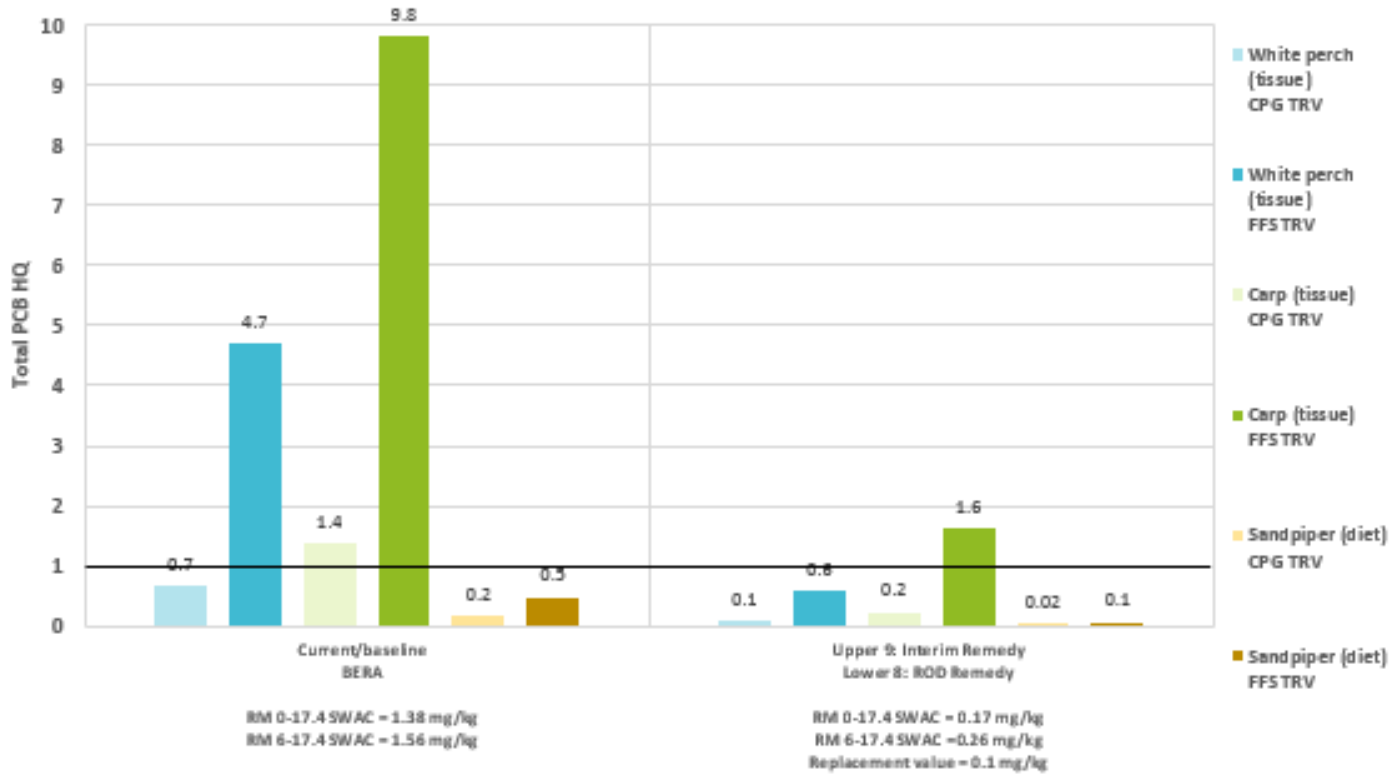

Table 1.

2,3,7,8-TCDD HQ

	Perch			Carp			Sandpiper		
	Baseline	Post IA	% Red	Baseline	Post IA	% Red	Baseline	Post IA	% Red
FFS TRV	111	4	96	344	15	96	4.5	0.16	96
CPG TRV	1.7	0.06	96	5.2	0.22	96	0.9	0.033	96

Total PCBs HQ

	Perch			Carp			Sandpiper		
	Baseline	Post IA	% Red	Baseline	Post IA	% Red	Baseline	Post IA	% Red
FFS TRV	4.7	0.58	88	9.8	1.6	84	0.48	0.059	88
CPG TRV	0.66	0.081	88	1.4	0.23	84	0.17	0.021	88